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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,408	07/15/2003	Yoshinobu Hasuka	SIW-063RCE	7646

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LAHIVE & COCKFIELD, LLP  
28 STATE STREET  
BOSTON, MA 02109

EXAMINER

COOLMAN, VAUGHN

ART UNIT	PAPER NUMBER
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3618

MAIL DATE	DELIVERY MODE
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06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/619,408

Applicant(s)

HASUKA ET AL.

Examiner

Vaughn T. Coolman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 4,5,10,11 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4,5,10,11 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 4, 5, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe (WO01/34424 and corresponding U.S. Patent No. 6,158,537) in view of Aberle et al (U.S. Patent No. 6,777,909 B1) and further in view of Bitsche et al (U.S. Patent No. 6,380,638).**

**[claim 4]** Nonobe discloses a fuel cell vehicle (15) equipped with a fuel cell(20), an idle control system (50), a driving motor (32), a power storage device (30), a hydrogen supply device (64), an air compressor (66) and auxiliary equipment (34), a method of generating electrical current comprising the steps of:

identifying the occurrence of an idle state (Column 11, lines 44-54), said idle state being based on the expected power consumption of the driving motor being lower than a predetermined value or an electrical power load of an electrical load being lower than a predetermined value;

selecting a power generation mode in response to the occurrence of the idle state; and

adjusting the power generation of, the fuel cell based on the selected power generation mode using said idle control system, wherein the selection of a power generation mode includes the further steps of;

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selecting an idle charge mode (Column 11, lines 55-60), said idle charge mode being selected based on a determination that said power storage device does not exceed a predetermined parameter (Column 11, line 57); and

adjusting the electrical current generated by the fuel cell (Column 14, lines 18-34)

Nonobe does not disclose adjusting said electrical current according to an optimum power generation efficiency of the fuel cell or the details of such a method.

Aberle teaches a method of determining optimum power generation efficiency based on identified parameters of the components of a fuel cell vehicle. Aberle teaches the concept that the efficiency of a fuel cell system can be increased by operating the fuel cell at high power during periods of low power demand (idle – column 5, line 11) while charging a power storage device. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the fuel cell idle method shown by Nonobe with the power generation efficiency parameters as taught by Aberle, since such a modification would provide the advantage of storing power that can be used for acceleration or powering auxiliary systems while improving overall fuel efficiency at the same time.

The combination would disclose, as would have been obvious to one of ordinary skill in the art at the time the invention was made, the adjustment of the electrical current generated by the fuel cell to an optimum level according to said optimum power generation efficiency includes the further steps of:

determining a total electrical power generated by the fuel cell (taught by both Nonobe and Aberle);

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subtracting an electrical power consumption of the air compressor (basic calculation – Nonobe discloses the fact that the operation of the compressor is powered by the fuel cell in column 14, lines 44-51 and acknowledges the importance of factoring it into efficiency);

dividing a result of the total electrical power generated by the fuel cell minus the electrical power consumption of the air compressor by the total electrical power generated by the fuel cell and multiplying an overall result by 100% to arrive at an efficiency percentage (basic engineering math common to one of ordinary skill in the art) and adjusting the power generated by the fuel cell based on said efficiency percentage (basic programming of the controller of either Nonobe or Aberle in order to maintain fuel efficiency at the best level possible whenever possible).

Nonobe further discloses the selection of a power generation mode comprises the further steps of: selecting an idle stop mode, said idle stop mode being selected based on a determination that electrical power stored in said power storage device exceeds a predetermined parameter

Neither Nonobe nor Aberle explicitly disclose stopping the generation of electric current by said fuel cell and using the power storage device to supply electrical power to either the driving motor or the auxiliary equipment in the idle stop mode. However, Bitsche teaches a method of generating electrical current in a fuel cell vehicle including an idle stop mode (standstill) wherein electrical current generation by the fuel cell (1) is stopped and the power storage device (2) supplies electrical power to the vehicle auxiliary equipment (4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus shown by Nonobe as modified by Aberle with the idle stop mode characteristics of

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Bitsche in order to provide the advantage of saving the fuel cell from unnecessary degradation in the idle stop mode.

**[claim 5]** Nonobe further discloses the electrical power load of the electrical load including the power requirements of said driving motor, the power requirements of said air compressor used to supply hydrogen from said hydrogen supply to said fuel cell and the power requirements of said auxiliary equipment in said fuel cell vehicle (Column 8, line 47 thru column 9 line 12; column 14, lines 35-51).

**[claim 10]** Nonobe further discloses said generated electrical current being stored in said power storage device (see above).

**[claim 11]** Nonobe further discloses identifying a need for increased electrical power while in said idle charge mode; and exiting said idle charge mode to return to a normal power generation mode, said normal power generation mode supplying electrical current directly from said fuel cell to said driving motor and said auxiliary equipment (Column 11, lines 30-43).

**Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe in view of Bitsche et al.**

**[claim 14]** Nonobe discloses a fuel cell vehicle (15) equipped with a fuel cell(20), an idle control system (50), a driving motor (32), a power storage device (30), a hydrogen supply device (64), an air compressor (66) and auxiliary equipment (34), a method of generating electrical current comprising the steps of:

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identifying the occurrence of an idle state (Column 11, lines 44-54), said idle state being based on the expected power consumption of the driving motor being lower than a predetermined value or an electrical power load of an electrical load being lower than a predetermined value;

selecting a power generation mode in response to the occurrence of the idle state; and

adjusting the power generation of, the fuel cell based on the selected power generation mode using said idle control system, wherein the selection of a power generation mode includes the further steps of;

selecting an idle stop mode, said idle stop mode being selected based on a determination that electrical power stored in said power storage device exceeds a predetermined parameter

Nonobe does not explicitly disclose stopping the generation of electric current by said fuel cell and using the power storage device to supply electrical power to either the driving motor or the auxiliary equipment in the idle stop mode. However, Bitsche teaches a method of generating electrical current in a fuel cell vehicle including an idle stop mode (standstill) wherein electrical current generation by the fuel cell (1) is stopped and the power storage device (2) supplies electrical power to the vehicle auxiliary equipment (4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus shown by Nonobe as modified by Aberle with the idle stop mode characteristics of Bitsche in order to provide the advantage of saving the fuel cell from unnecessary degradation in the idle stop mode.

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*Response to Arguments*

Applicant's arguments with respect to claims 4, 5, 10, and 11 have been considered but are moot in view of the new ground(s) of rejection.

The exact combination of claim elements in claim 4 has not previously been presented by applicant nor considered by the examiner.

*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

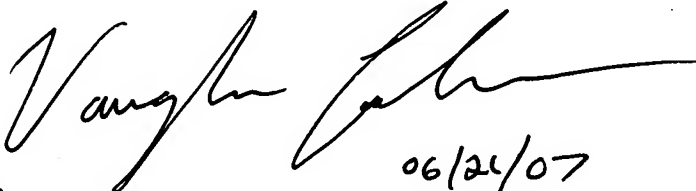
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vaughn T. Coolman whose telephone number is (571) 272-6014. The examiner can normally be reached on Monday thru Friday, 8am-6pm EST.




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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Ellis can be reached on (571) 272-6914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
vtc 06/21/07

Travis Coolman  
Examiner  
Art Unit 3618

  
J. ALLEN SHRIVER  
PRIMARY EXAMINER